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# Sensitivity Analysis for Safety Design Verification of General Aviation Reciprocating Aircraft Engine

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**Abstract**

This paper presents an application of global sensitivity analysis for system safety analysis and airworthiness compliance of reciprocating aircraft engine. A deterministic engine thermodynamics model was developed and samples were generated by Monte Carlo method for the parameters used in engine model. Then, importance indices were determined by global sensitivity analysis. Eventually, design was improved to satisfy the airworthiness requirements. The results reveal that, by using global sensitivity analysis, the parameters could be ranked with respect to their importance, including first order indices and total sensitivity indices. By reducing the uncertainty of parameters and adjusting the range of inputs, safety criteria would be satisfied.



Keywords: Sensitivity analysis; Safety analysis; Airworthiness; Reciprocating aircraft engine; Design verification

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